

Induction and Oestrus Synchronization in Sheep during Breeding and Non-breeding Season

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Abstract. This paper aim was to increase fertility by applying modern biotechnology: induction and oestrus synchronization of sheep in breeding and non-breeding season season with hormone therapy. The research has been carried out during April 2009 – June 2011 on a total of 130 autochthonous breeds of sheep (*Țurcană*), aged between 1,3 and 6 years. To achieve induction and synchronization of oestrus the animals were divided into four batches for each period (breeding and non-breeding season).

Best results judged by the number of recorded gestation were obtained in batch I (90%) in breeding season and batch V (75%) in non-breeding season. Intermediate values were obtained from batches II and VI (protocol-based on vaginal sponges and PGF2 α). So the gestation percentage of batches II after one oestrus cycle was 83.33% and 68.69% in non-breeding season. Modest compared with previous groups, both in season and out of season breeding were obtained from sheep in batch III (80%) and batch VII (54.55%) that received only vaginal sponges impregnated with progesterone. For the control groups during the breeding season the results obtained are approximately 15% lower than those obtained by hormonal induction (group IV 65%), and non-existent in non-breeding season (0%). Maneuvers of induction and oestrus synchronization presents economic advantages - shortening the time needed for the installation of gestation, the opportunity of birth grouping, recovery of healthy females remained nonpregnant for organizational reasons, preparation and organization of mating.

Keywords: sheep, oestrus induction, oestrus synchronization, progestagen.

INTRODUCTION

Estrus synchronization (ES) in livestock focuses on the manipulation of either the luteal or the follicular phase of the estrous cycle (Bogdan et. al., 2006). In sheep, the opportunity for control is greater during the luteal phase, which is of longer duration and more responsive to manipulation (Groza, 1996; Romano, 1998). Strategies can be employed to extend the luteal phase by supplying exogenous progesterone or to shorten this phase by prematurely regressing existing corpora lutea (CL) (Thompson et. al., 1990). Successful techniques must not only establish tight synchrony, but also provide an acceptable level of fertility upon artificial insemination or natural mating. The latter is commonly accomplished

through co-treatments using gonadotropin (Rajamahendran et. al., 1993). After these conditions are met, ES becomes the basis for successful AI and embryo transfer programs (Perkins et. al., 1994; Fenton et. al., 1997).

MATERIALS AND METHODS

The research has been carried out during April 2009 – June 2011 on a total of 130 autochthonous breeds of sheep (*Țurcană*), aged between 1,3 and 6 years, Chioarului area, Maramureș.

To achieve induction and synchronization of oestrus the animals were divided into four batches for each period (breeding and non-breeding season):

⇒ batch I (n = 30 sheep in breeding season) - hormonal therapy with vaginal sponges impregnated with progesterone (Veramix 60 mg, Phizer) maintained for 14 days. On the day of vaginal sponges extraction each sheep was treated with 500 IU PMSG (Folligon, Intervet);

⇒ batch II (n = 30 sheep in breeding season) after treatment with progesterone (Veramix, 60 mg) for 14 days each sheep received 1 ml PGF₂α (Dinolytic, Pfizer);

⇒ batch III (n = 30 sheep in breeding season) has undergone induction and synchronization of oestrus with intravaginal sponges impregnated with progestagen (Veramix 60 mg);

⇒ batch IV (n = 40 sheep in breeding season) - the control group not subject to hormonal treatment;

⇒ batch V (n = 28 sheep in non-breeding season) was subjected to hormonal treatment with intravaginal sponges (Veramix 60mg) for 14 days. After vaginal sponges extraction sheep were treated with 500 IU PMSG (Sergon, Bioveta);

⇒ batch VI (n = 45 sheep in non-breeding season) - vaginal sponges withdrawal (Veramix, 60 mg) + 1 ml/sheep of PGF Veyx[®] forte (Veyx-Pharma) + 1ml/sheep Gonavet Veyx (Veyx-Pharma) after occurrence of oestrus;

⇒ batch VII (n = 44 in non-breeding season) was subjected to hormonal treatment only with vaginal sponges (Veramix, 60mg);

⇒ batch VIII (n = 13 sheep in non-breeding season) the control group not subject to hormonal treatment.

Routine For Administration Of Veramix Sponges:

1. the sponge is inserted into the wide end of the applicator and pushed half the length with the plunger;
2. the applicator is inserted into the ewe's vagina and pushed gently as far as it will go. In maiden ewes the sponge may be positioned with the finger;
3. the sponge is pushed out of the applicator with the plunger and the applicator is removed;
4. the plunger is removed leaving the nylon lines of the sponge protruding (fig. 1).

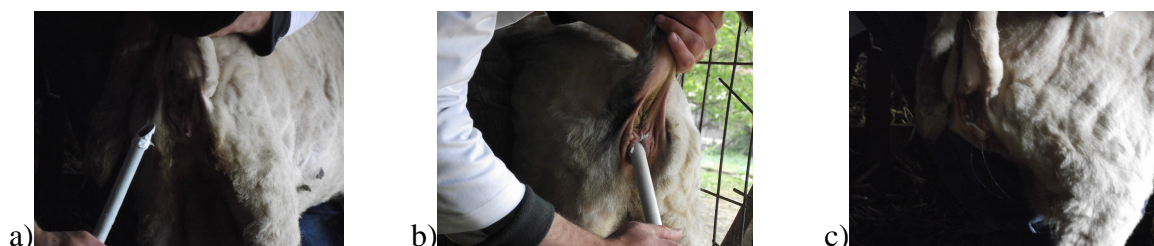


Fig. 1 (a, b, c)- Introduction of vaginal sponges

The sponges were removed 14 days after insertion by pulling on the attached strings with a gentle, steady motion. This can vary from 12 to 16 days but no longer or conception rates may be adversely affected.

RESULTS AND DISCUSSION

The results obtained after induction and synchronization of oestrus in Țurcană sheep during breeding and non-breeding season were the following (table 1):

Tab. 1

Results obtained in Țurcană sheep

| | <i>No. batch</i> | <i>% oestrus manifestation</i> | <i>% repeating oestrus</i> | <i>% gestation after one oestrus cycle</i> | <i>% prolificity</i> |
|----------------------------|------------------|--------------------------------|----------------------------|--|----------------------|
| Breeding season | Batch I | 96.67 | 6.67 | 90.00 | 123.33 |
| | Batch II | 93.33 | 10.00 | 83.33 | 113.33 |
| | Batch III | 93.33 | 13.33 | 80.00 | 100.00 |
| | Batch IV | 80.00 | 15.00 | 65.00 | 75.00 |
| Non-breeding season | Batch V | 82.14 | 7.14 | 75.00 | 103.57 |
| | Batch VI | 75.56 | 6.67 | 68.89 | 91.11 |
| | Batch VII | 79.55 | 13.64 | 65.91 | 79.55 |
| | Batch VIII | 15.38 | 15.38 | 0.00 | 0.00 |

Estrus synchronization experiment using vaginal sponges and PMSG (batch I and batch V) aprovided good results both in season and out of season: percentage of sheep in estrus was favorable to those in breeding season (batch I – 96.66%) compared to those in non-breeding season (batch V – 82.14%); the return rate was 6.67% for batch I and 7.14 in batch V; percentage of pregnancies after a estrus cycle was 90% in group I and 75% group V; sheep prolificacy was 123.33% during the season, and 103.57% during out of season.

Estrus synchronization experiment using vaginal sponges and prostaglandin (batch II and batch VI) led to satisfactory results both in season and out of season. Comparing the results obtained can deduced the following aspects: percentage of ewes that expressed estrus was for sheep in breeding season (93.33%) than in non-breeding season (75.56%); gonadorelin administration increases ovulation rate and therefore the number of gestation after one oestrus cycle, so it's administration may increase the percentage of sheep that does not repeat heats after oestrus synchronization; the prolificity rate was 113.33% for batch II and 91.11% in non-breeding season.

Data recorded in batch III and VII modest compared with previous groups, both in season and out of season: percentage of ewes that expressed estrus was 93.33% in breeding season and 79.55% for batch VII; percentage of pregnancy during the season (80%) and season (65.91%) shows a lack of LH leading to ovulation failure; Thus, the return rate was 13.33% in the season, and 13.64% in out of season; percentage of prolificity is 100% group during the breeding season and 79.55% in group synchronized during anoestrus. This method presents an economic advantage by using a low heat maneuvers to achieve synchronization, but also a disadvantage - the low number of sheep who developed pregnancy after treatment.

Control groups (batch IV and VIII) have provided modest values during breeding season, and lowered during the non-breeding season. Examining the results obtained in these batches can define the following discussion: during the breeding season the results obtained are approximately 10% lower than those obtained by hormonal induction; in the out of season

control group the numbers of sheep that expressed estrus is much lower (15.38%) than in plots which estrus was induced; gestation rate after the first oestrus cycle is low during the season (65%) and non-existent in non-breeding season (0%).

The results obtained in 2009-2011 regarding induction and oestrus synchronization in Țurcană sheep show that the percentage of prolificity in breeding season (batch I, batch II, batch III) is higher than in non-breeding season (batch V, batch VI, batch VII). Thus, the highest prolificity percentage registered in the research was recorded in batch I (123.33%), followed by batch II (113.33%) and batch V (103.57%). In batch VIII was not diagnose pregnancy and therefore the prolificity rate was 0%. For other batches were recorded intermediate values between 75-100% (Table 2).

Tab. 2

Number of lambs obtained

| No. batch | No. lambs | | % <i>prolificity</i> |
|--------------|----------------|-----------------|----------------------|
| | single foaling | fătări gemelare | |
| Batch I | 17 | 20 | 123.33 |
| Batch II | 16 | 18 | 113.33 |
| Batch III | 18 | 12 | 100.00 |
| Batch IV | 22 | 8 | 75.00 |
| Batch V | 13 | 16 | 103.57 |
| Batch VI | 21 | 20 | 91.11 |
| Batch VII | 19 | 5 | 79.55 |
| Batch VIII | 0 | 0 | 0.00 |
| TOTAL | 126 | 99 | |

CONCLUSIONS

- Best results judged by the number of recorded gestation were obtained in batch I (90%) in breeding season and batch V (75%) in non-breeding season.
- For other batches were recorded intermediate values between 54.55-83.33%.
- Maneuvers of induction and oestrus synchronization presents economic advantages - shortening the time needed for the installation of gestation, the opportunity of birth grouping, recovery of healthy females remained nonpregnant for organizational reasons, preparation and organization of mating.

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